REMARKS

In the Office Action dated December 9, 2009, claims 18, 19 and 22-38, in the above-identified U.S. patent application were rejected. Reconsideration of the rejections is respectfully requested in view of the above amendments and the following remarks. Claims 18, 19, 22-23, 26-27 and 29-38 remain in this application, claims 20-21 have been withdrawn and claims 1-17, 24, 25 and 28 have been canceled. The claims have been amended to indicate that the carrier has at least 50 different biopolymer receptor zones, the building blocks are selected from the group consisting of oligomeric building blocks and building blocks that carry a hapten group, the receptors are synthesized in situ, the biopolymeric receptors are selected from the group consisting of nucleic acids, peptide nucleic acids, proteins, peptides and carbohydrates, and detection of the hapten groups is correlated with the quality and/or the efficiency of the in situ biopolymeric receptor synthesis. These amendments are supported at least by the disclosure on page 6, lines 22-23, page 5, lines 15 and 19-20, page 9, line 1-7, page 3, lines 17-19, 25-27 and 37.

Claims 18-19, 22-23 and 25-38 were rejected under 35 USC §112, first paragraph, as lacking an adequate written description. Claim 18 has been amended to recite that the carrier has at least 50 biopolymer receptor zones, wherein each zone is different (supported by previous claim 28 and page 6, lines 22-23), the biopolymer receptor building blocks are selected from the group consisting of oligomeric building blocks (supported by page 5, line 15) and building blocks that carry a hapten group (supported by page 9, first paragraph) , and the biopolymeric receptors are synthesized in situ (supported by page 3, lines 17-19 and 37) and are

selected from the group consisting of nucleic acids, peptide nucleic acids, proteins, peptides, and carbohydrates (supported by page 5, lines 19-20). In view of the above amendments, applicants contend that the present claims are adequately supported by the written description and request that this rejection be withdrawn.

Claims 18-19, 22-23 and 25-38 were rejected under 35 USC §112, second paragraph, as indefinite. Claim 18 was found indefinite regarding the building blocks. Claim 18 has been amended to clarify the types of building blocks in the liquid, the particular synthesis method used is not essential as any synthesis method can be used. Claim 19 was found indefinite regarding the conditions for the time specific immobilization. In view of the disclosure in the present application and the knowledge in the art, one skilled in the art would know the term "time specific" means that the immobilization is carried out at a predetermined point in time. For example, photoactivatable receptor building blocks can be used and activated at a predetermined time. Photoactivatable building blocks are disclosed on page 2, lines 1-5, of the present application. Claim 23 was found indefinite regarding the term "closed channel". Applicants respectfully contend that this term has a generally accepted meaning in the art. This term means that the lumen cannot be accessed except from the inlet and the outlet. In contrast to a "closed channel", an "open channel" can be accessed from the top. Regarding the 50-100 different polymer receptor zones, applicants point out the disclosure on page 6, lines 20-32 of the present application which indicates that the different receptor zones are able to react with different analytes in a single sample. As indicated on page 6, the receptors in each zone of the carrier can comprise only a single sequence of building blocks or

one or more zones can comprise a plurality of different sequences of building blocks. The terms "high affinity", "specific", "adjacent" and "disposed" were found indefinite. The terms "specific", "adjacent" and "disposed" have been deleted from the claims. Regarding the term "high affinity", applicants contend that the language "high affinity" is well known in the art. Enclosed with this response are two references which show that this language has an accepted meaning in the art. Applicants also point out pages 6-7 of the present application which discuss "high affinity" interactions. In view of the above amendments and disclosure, applicants request that this rejection be withdrawn.

Claims 18, 19, 22-23, 25-27 and 30-36 were rejected under 35 USC §102(e) as anticipated by Bamdad. Bamdad discloses a microfluidic system which uses interruption of flow through a channel to concentrate or detect analytes for screening. Bamdad describes nano-filters which are assembled in situ in a flow channel. The nano-filters can be differentially modified at different locations to perform a variety of assays on the same sample. Claim 18 has been amended to clarify that the detection of the hapten groups is correlated with the quality and/or the efficiency of the in situ biopolymeric receptor synthesis. Bamdad does not disclose monitoring the synthesis of the biopolymeric receptors using haptens and thus does not anticipate the present claims. While Bamdad does disclose the use of haptens, Bamdad's haptens are not used to monitor the synthesis of the receptors. In view of the above amendments and arguments, applicants request that this rejection be withdrawn.

Claims 18-19, 22-23 and 25-36 were rejected under 35 USC §103(a) as unpatentable over Bamdad in view of Buzby. Buzby was cited for the disclosure of hapten groups. The office action contends that it would have been obvious to use the haptens disclosed in Buzby for stabilizing molecular pairs bound on a surface as in Bamdad. Applicants respectfully point out that neither Buzby or Bamdad disclose a method for producing a carrier wherein hapten groups are applied to the carrier before, during or/and after the synthesis of the biopolymeric receptors to monitor the synthesis of the biopolymeric receptors. Therefore, the combination of Bamdad and Buzby does not render the presently claimed invention obvious and applicants request that this rejection be withdrawn.

Claims 18-19, 22-23, and 25-38 were rejected under 35 USC §103(a) as unpatentable over WO 0013018, WO 0289971 or WO 0232567 in view of Wu, Gray or Edwards. As discussed above, the claims have been amended to clarify that the haptens are used to monitor the synthesis of the biopolymeric receptors. None of the cited prior art individually or in combination suggests or discloses using haptens in this manner. In view of the above amendments and discussion, applicants request that this rejection be withdrawn.

Claims 18-19, 22-23 and 25-38 were rejected on the ground of nonstatutory obviousness-type double patenting as unpatentable over claim 1 of U.S. Patent No. 7,097,974 in view of Bamdad or Buzby. The claims in U.S. Patent No. 7,097,974 do not suggest or disclose the use of haptens to monitor the synthesis of the biopolymeric receptors. As discussed above, neither Buzby or Bamdad disclose a method for producing a carrier wherein hapten groups are applied to the carrier

before, during or/and after the synthesis of the biopolymeric receptors to monitor the synthesis of the biopolymeric receptors and thus these references do not cure the deficiencies in U.S. Patent No. 7,097,974. In view of the above amendments and discussion, applicants request that this rejection be withdrawn.

Applicants respectfully submit that all of claims 18-19, 22-23, 26-27 and 29-38 are now in condition for allowance. If it is believed that the application is not in condition for allowance, it is respectfully requested that the undersigned attorney be contacted at the telephone number below.

In the event this paper is not considered to be timely filed, the Applicant respectfully petitions for an appropriate extension of time. Any fee for such an extension together with any additional fees that may be due with respect to this paper, may be charged to Counsel's Deposit Account No. 02-2135.

Respectfully submitted,

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Structural origins of high-affinity biotin binding to streptavidin.

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Abstract

The high affinity of the noncovalent interaction between biotin and streptavidin forms the basis for many diagnostic assays that require the formation of an irreversible and specific linkage between biological macromolecules. Comparison of the refined crystal structures of apo and a streptavidin:biotin complex shows that the high affinity results from several factors. These factors include the formation of multiple hydrogen bonds and van der Waals interactions between biotin and the protein, together with the ordering of surface polypeptide loops that bury the biotin in the protein interior. Structural alterations at the biotin binding site produce quaternary changes in the streptavidin tetramer. These changes apparently propagate through cooperative deformations in the twisted beta sheets that link tetramer subunits.

PMID: 2911722 [PubMed - indexed for MEDLINE]

J Immunol. 1982 Sep;129(3):1165-72.

High-affinity monoclonal antibodies to the cardiac glycoside, digoxin.

Hunter MM, Margolies MN, Ju A, Haber E

PMID: 6179995 [PubMed - indexed for MEDLINE]